Examples for linear algebra

17^{th} January, 2006

1. Solve using the Gaussian elimination,

$$3x_1 + 8x_2 = 53$$
$$6x_1 + 2x_2 = 50$$

Solution. Write the equations in an augmented matrix,

$$[\,A \quad B\,] = \begin{bmatrix} 3 & 8 & 53 \\ 6 & 2 & 50 \end{bmatrix}$$

Row 1 times $\frac{1}{3}$,

$$\begin{bmatrix} 1 & \frac{8}{3} & \frac{53}{3} \\ 6 & 2 & 50 \end{bmatrix}$$

Row 1 subtracted by 2 times of Row 1,

$$\begin{bmatrix} 1 & \frac{8}{3} & \frac{53}{3} \\ 0 & -14 & -56 \end{bmatrix}$$

Row 2 times $-\frac{1}{14}$,

$$\begin{bmatrix} 1 & \frac{8}{3} & \frac{53}{3} \\ 0 & 1 & 4 \end{bmatrix}$$

Row 1 subtracted by $\frac{8}{3}$ times of Row 2,

$$\begin{bmatrix} 1 & 0 & 7 \\ 0 & 1 & 4 \end{bmatrix}$$

Therefore $\bar{x}_1 = 7$ and $\bar{x}_2 = 4$.

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